Memorial EMS
Decatur Memorial EMS
Springfield Memorial EMS

TRAUMA PROTOCOLS

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Routine Trauma Care Protocol

Assessment and management of patients with injury or suspected injury shall be conducted in accordance with ITLS/ PHTLS guidelines. Time from injury to definitive trauma center care is a critical factor in the morbidity and mortality of the injured patient. Scene times should be kept to a minimum and the patient should be promptly transported to the trauma center.

EMR, EMT, TEMS, A-EMT/ EMT-I, Paramedic Care

1. **Scene Assessment (Scene Size-Up)**
   - Ensure scene safety – identify any hazards (*e.g.* fire, downed power lines, unstable vehicle, leaking fuel, weapons).
   - Determine the number of patients.
   - Identify the **mechanism of injury** (gunshot wound, vehicle rollover, high speed crash, ejection from the vehicle).
   - Identify special extrication needs, if any.
   - Call for additional resources if needed. If a Paramedic intercept is needed, start them early.
2. **Primary Survey (Initial Assessment)**
   The purpose of the primary assessment is for the prehospital provider to rapidly identify and manage life-threatening conditions:
   - Obtain a general impression of the patient's condition.
   - Assess, secure and maintain a patent airway while simultaneously using C-spine precautions.
   - Assess breathing and respiratory effort:
     - Approximate respiratory rate.
     - Assess quality of respiratory effort (depth of ventilation and movement of air).
   - **Oxygen**: If respiratory distress noted, 15 LPM via NRM or 6 LPM via nasal cannula.
     - Maintain SPO2 $\geq$ 94%
     - **Chest Seal**: if open chest wound identified apply occlusive dressing.
     - **Needle Chest Decompression (TEMS and Paramedic only)**: if the patient is in severe respiratory distress or cardiac arrest with s/s of tension pneumothorax.
   - Assess circulation:
     - Evaluate carotid and radial pulses.
     - Evaluate skin color, temperature and condition.
     - Immediately control major external bleeding. Treat based on *Bleeding Control Protocol* if needed.
   - **Critical Decision (**based on mechanism of injury & initial exam**)**:
     - Limit scene time to 10 minutes or less if the patient has a significant mechanism of injury or meets "Load & Go" criteria.

Routine Trauma Care Protocol

EMR, EMT, TEMS, A-EMT/ EMT-I, Paramedic Care

Primary Survey (Initial Assessment) (continued)

- Expose the patient:
  - Cut the patient's clothing away quickly to adequately assess for the presence (or absence) of injuries.

4. Secondary Survey (Focused History & Physical Exam)

The secondary survey is a head-to-toe evaluation of the patient. The object of this survey is to identify injuries or problems that were not identified during the primary survey.

- Examine the head:
  - Search for any soft tissue injuries.
  - Palpate the bones of the face & skull to identify deformity, depression, crepitus, or other injury.
  - Check pupils for size, reactivity to light, equality, accommodation, roundness, and shape.
- Examine the neck:
  - Examine for contusions, abrasions, lacerations, or other injury.
  - Check for JVD, tracheal deviation, deformity.
  - Palpate the c-spine for deformity & tenderness.
- Examine the chest:
  - Closely examine for deformity, contusions, redness, abrasions, lacerations, penetrating trauma, or other injury.
  - Look for flail segments, paradoxical movement & crepitus.
  - Auscultate breath sounds.
  - Watch for supraclavicular and intercostals retractions.
- Examine the abdomen:
  - Examine for contusions, redness, abrasions, lacerations, penetrating trauma, or other injury.
  - Palpate the abdomen and examine for tenderness, rigidity, and distention.
- Examine the pelvis:
  - Examine for contusions, redness, abrasions, lacerations, deformity, or other injury.
  - Palpate for instability and crepitus. **DO NOT** perform pelvic rock.

Routine Trauma Care Protocol

EMR, EMT, TEMS, A-EMT/ EMT-I, Paramedic Care

5. **Secondary Survey (Focused History & Physical Exam) (continued)**
    - Examine the back:
        - Log roll with a minimum of 2 rescuers protecting the spine.
        - Look for contusions, abrasions, lacerations, penetrating trauma, deformity, or any other injury.
        - Log roll onto SMR transfer device and perform SMR if based on *Spinal Motion Restriction Protocol and SMR Decision Scheme*.
    - Examine the extremities:
        - Examine for contusions abrasions, lacerations, penetrating trauma, deformity, or any other injury.
        - Manage injuries enroute to the hospital.
    - Neurological exam:
        - Calculate Glasgow Coma Scale (GCS)
        - Reassess pupils.
        - Assess grip strength & equality and sensation.
        - Calculate Revised Trauma Score (RTS)
    - Vital signs:
        - Blood pressure
        - Pulse
        - Respirations
        - Pulse Oximetry
    - History:
        - Obtain a SAMPLE history if possible.
        - Signs & symptoms
        - Allergies
        - Medications
        - Past medical history
        - Last oral intake
        - Events of the incident
    - Interventions (enroute)
        - Cardiac monitor
        - Blood glucose level
        - IV access / fluid bolus
        - Wound care
        - Splinting

6. **Monitoring and Reassessment (Ongoing Assessment)**
    - Evaluate effectiveness of interventions
    - Vital signs every *5 minutes*
    - Reassess mental status (GCS) every *5 minutes.*
    - Reassess Revised Trauma Score (RTS) every *5 minutes.*

Routine Trauma Care Protocol

EMR, EMT, TEMS, A-EMT/ EMT-I, Paramedic Care

EMS Alert Patient Report- Trauma

The following information and format necessitate expedited delivery of information for potential pre-hospital trauma declaration. Scene time should be limited to ten minutes or less unless extrication is needed. Report should be provided as early as possible to activate trauma teams.

1. Unit identification
2. ETA & Destination if other than Medical Control Center being contacted.
    a. (Agencies should utilize their approved local Medical Control.)
    b. (Agencies whose normal Medical Control Center may not always be the receiving destination of a Trauma patient must communicate early to determine destination. Report to include everything needed to activate Trauma Team.)
3. "Inbound EMS Alert Patient Report- Potential Trauma."
    a. The above statement should be made within the first 5 seconds of the communication.
4. Mechanism of injury and comorbidities
    a. Type (MVC/ fall/ stab/ GSW/ burn)
    b. Incident details (speed/ protective factors/height/ scale/ etc.)
    c. Blood thinner status
    d. Any loss or decrease of consciousness.
5. Patient status
    a. Level of conscious (Include GCS)
    b. Significant injuries
    c. Vitals and if ever hypotensive
6. Acknowledge necessary treatment plan. (May not be complete at time of communication.)
7. Determine destination (facility and location).

Transporting Units

1. Destination decisions must be informed decisions based on local and regional destination capabilities, time since onset and transportation distances.
    a. See *Patient Destination Criteria*.
    b. Include Medical Control in the decision making.

Routine Trauma Care Protocol

Glasgow Coma Scale

Eye Opening	**Spontaneous**	**4**
	To Voice	**3**
	To Pain	**2**
	None	**1**
Verbal Response	**Oriented**	**5**
	Confused	**4**
	Inappropriate Words	**3**
	Incomprehensible Words	**2**
	None	**1**
Motor Response	**Obeys Commands**	**6**
	Localizes Pain	**5**
	Withdraw (pain)	**4**
	Flexion (pain)	**3**
	Extension (pain)	**2**
	None	**1**
	TOTAL	

Revised Trauma Score

		Score
A. Ventilatory Rate	**10-29/min**	**4**
	> 29/min	**3**
	6-9/min	**2**
	1-5/min	**1**
	0	**0**
B. Systolic Blood Pressure	**> 89 mmHg**	**4**
	76-89 mmHg	**3**
	50-75 mmHg	**2**
	01-49 mmHg	**1**
	No pulse	**0**
C. Glasgow Coma Scale Score	**13-15**	**4**
	9-12	**3**
	6-8	**2**
	4-5	**1**
	< 4	**0**

RTS Total = A+B+C

Trauma Shock Protocol

Common signs and symptoms of shock include:

- Confusion
- Restlessness
- Combativeness
- ALOC
- Pallor
- Diaphoresis
- Unexplained tachycardia (persistent or worsening after stress of the event subsides)
- Tachypnea
- Hypotension

Conditions that may indicate impending shock include:

- Significant mechanism of injury
- Tender and/or distended abdomen
- Pelvic instability
- Bilateral femur fractures

"Load & Go" with any trauma patient with signs and symptoms of shock – on scene treatment should be minimal. Conduct a *Primary Survey*, manage the airway, take C-spine precautions place in spinal motion restriction (SMR) if indicated, and control any life-threatening hemorrhage. Contact Medical Control as early as possible.

EMR Care

EMR Care should be focused on assessing the situation and initiating routine patient care to assure that the patient has a patent airway, is breathing and has a perfusing pulse as well as beginning treatment for shock.

1. Render initial care in accordance with the *Routine Patient Care Protocol* and *Routine Trauma Care Protocol*.
2. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a. If no obvious respiratory distress is noted, apply a pulse ox. If $\geq$ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If $\leq$94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to $\geq$94%.
3. Control bleeding based on *Bleeding Control Protocol*.

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Trauma Shock Protocol

EMT Care

EMT Care should be directed at conducting a thorough patient assessment, initiating routine patient care to assure that the patient has a patent airway, is breathing and has a perfusing pulse as well as beginning treatment for shock and preparing the patient for or providing transport.

1. EMT Care includes all components of *EMR Care.*
2. Apply **waveform capnography** (if equipped)
3. Initiate ALS intercept and transport as soon as possible.

A-EMT/ EMT-I

A-EMT/ EMT-I should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, and preparing for or providing patient transport.

1. A-EMT/ EMT-I includes all components of *EMT Care.*
2. **IV Fluid Therapy**: 500mL fluid boluses as needed to maintain a systolic BP of 90mmHg. SBP 90 mmHg is optimum to avoid dislodging a clot. ***This permissive hypotension does NOT apply to significant TBI and pregnant patients*.**

Paramedic Care

Paramedic Care should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, and preparing for or providing patient transport.

1. Paramedic Care includes all components of *A-EMT/ EMT-I.*
2. If advanced airway control becomes necessary, maintain inline cervical immobilization. Consider first line use of airway adjuncts such as the supraglottic airway if intubation appears difficult, or if unable to strictly maintain inline cervical immobilization.
3. **Contact Medical Control** as soon as possible.

Critical Thinking Elements

- **Hypotension may not occur in the early stages of shock. However, aggressive therapy is indicated if there is a significant mechanism of injury and/or shock is suspected.**
- **IV access should be obtained enroute and should not delay transport time.**
- **IV fluid bolus/flow rate should be regulated and patient response to fluid monitored closely.**

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Traumatic Head Injury Protocol

Injuries to the head may cause underlying brain tissue damage. Increased intracranial pressure from bleeding or swelling tissue is a common threat after head trauma.
Common signs and symptoms of increased intracranial pressure include:

- Confusion
- ALOC
- Dilated or unequal pupils
- Markedly increased systolic blood pressure
- Decreased pulse (bradycardia)
- Abnormal respiratory patterns
- Nausea/ vomiting

Hypotension, hypoxia, and hyperventilation should be avoided at all costs as they all significantly increase the mortality of head injury patients.

EMR Care

EMR Care should be focused on assessing the situation and initiating routine patient care to assure that the patient has a patent airway, is breathing and has a perfusing pulse as well as beginning treatment for shock.

1. Render initial care in accordance with the *Routine Patient Care Protocol*.
2. Be prepared for vomiting and have suction readily available.
3. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a. If no obvious respiratory distress is noted, apply a pulse ox. If ≥ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If ≤94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to ≥94%.
4. **Patients with poor respiratory effort may require ventilation with a BVM at 8-12 breaths/min. Remember: hyperventilating causes cerebral vasoconstriction and in turn decreased cerebral blood flow.**
5. Control bleeding based on *Bleeding Control Protocol*.

EMT Care

EMT Care should be directed at conducting a thorough patient assessment, initiating routine patient care to assure that the patient has a patent airway, is breathing and has a perfusing pulse as well as beginning treatment for shock and preparing the patient for or providing transport.

1. EMT Care includes all components of *EMR Care*.
2. Repeat vital signs, GCS & RTS every ***5 minutes***.

Traumatic Head Injury Protocol

EMT Care (Cont.)

3. If patient has an altered mental status, perform **blood glucose level test**. Treat based on *Altered Mental Status Protocol* as appropriate.
4. Apply **waveform capnography** (if equipped).
5. Initiate Paramedic intercept if needed and transport as soon as possible.

A-EMT/ EMT-I

A-EMT/ EMT-I should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion and preparing for or providing patient transport.

1. A-EMT/ EMT-I includes all components of *EMT Care.*
2. **IV Fluid Therapy**: 500mL fluid boluses as needed to ***maintain a systolic BP ≥ 110 mmHg***.
3. Avoid hyperventilation. If any assisted ventilations (BVM, Supraglottic, ETI) are required, goal directed ETCO2 should be 35- 45.

Paramedic Care

Paramedic Care should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion and preparing for or providing patient transport.

1. Paramedic Care includes all components of *A-EMT/ EMT-I.*
2. **Contact Medical Control** as soon as possible.

Critical Thinking Elements

- **Head trauma patients should receive oxygen to keep SpO_2 > 94%, preferably via NRM. Even just one SPO2 reading below 90% can double the mortality in a patient with significant TBI.**
- **Abnormal Pupils and Neuro-defects are strong indicators of Neurological outcomes.**
- **Deeply comatose patients may require advanced airway placement (GCS < 8). Consider a supraglottic airway or BVM.**
- **Treat for hemorrhagic shock if the patient's systolic BP is < 110mmHg. Hypotension decreases cerebral perfusion and worsens brain injury and must be corrected.**

Spinal Trauma Protocol

Injuries to the spine commonly result from mechanism of injury involving high kinetic energy. Any neurovascular impairment or spinal deformities are indicative of possible spinal trauma.

Refer to Field Triage Scheme for most common mechanisms of injury.

EMR Care

EMR Care should be focused on assessing the situation and initiating routine patient care to assure that the patient has a patent airway, is breathing and has a perfusing pulse as well as beginning treatment for shock.

1. Render initial care in accordance with the *Routine Patient Care Protocol*.
2. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a. If no obvious respiratory distress is noted, apply a pulse ox. If $\geq$ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If $\leq$94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to $\geq$94%.
    b. Frequently reassess the patient's airway & ventilatory status.
3. Assess and record any pain on palpation of the spine, any motor/sensory deficits of the extremities, abnormal arm position, ptosis and/or priapism.
4. Assess skin for temperature which will initially be warm, flushed, and dry (below the point of injury). Cover the patient and keep him/her warm.
5. Assess for neurogenic shock: decreased BP, decreased pulse, & decreased respiratory rate.
6. Perform SMR and protect paralyzed limbs by securing the patient to the backboard. Refer to *SMR Decision Scheme*.

EMT Care

EMT Care should be directed at conducting a thorough patient assessment, initiating routine patient care to assure that the patient has a patent airway, is breathing and has a perfusing pulse as well as beginning treatment for shock and preparing the patient for or providing transport.

1. EMT Care includes all components of *EMR Care*.
2. Repeat vital signs, GCS & RTS every ***5 minutes***.
3. Initiate ALS intercept and transport as soon as possible.
4. Apply **waveform capnography** (if equipped).

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Spinal Trauma Protocol

A-EMT/ EMT-I Care

A-EMT/ EMT-I should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, and preparing for or providing patient transport.

1. A-EMT/ EMT-I includes all components of *EMT Care*.
2. **IV Fluid Therapy**: 500mL fluid boluses as needed to maintain a systolic BP of 90 mmHg. **All hypotension in trauma patients should be presumed to be caused by blood loss and should be treated/ monitored accordingly until proven otherwise.**

Paramedic Care

Paramedic Care should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, and preparing for or providing patient transport.

1. Paramedic Care includes all components of *A-EMT/ EMT-I*.
2. Consider multiple large bore IVs.
3. Ready IVF on pressure bag and start **NS IV fluid bolus** if hypotensive with a goal systolic blood pressure > 90 mmHg. Caution in the setting of CHF (Rales in lungs)
4. **Norepinephrine**: In cases of Neurogenic Shock, if the patient remains hypotensive refractory to fluid resuscitation, initiate Norepinephrine if SBP remains ≤ 90mmHg or MAP ≤65mmHg.
   - MUST use 60 gtts/mL tubing.
   - Begin infusion at 4mcg/min (15 gtts/min) IO or large bore IV.
   - May increase by 4mcg/min (+15 gtts/min) every 5 min to maintain SBP>90mmHg or MAP>65mmHg.
   - Maximum rate 20mcg/min (75 gtts/min).
5. **Contact receiving hospital** as soon as possible.

DOSING CHART BASED ON 60 GTTS/MIN TUBING

Desired Dose (mcg/min)	4 mcg/min	8 mcg/min	12 mcg/min	16 mcg/min	20 mcg/min
Drip rate (drops/min)	15 gtts/min	30 gtts/min	45 gtts/min	60 gtts/min	75 gtts/min

- Norepinephrine is 4mg in 250mL of D5W (typical) giving a concentration of 16mcg/mL.
- Norepinephrine and 60 gtt tubing must be stored together in drug bag.
- Monitor IV site for any signs of medication extravasation. If concerns for norepinephrine extravasation, discontinue use of involved IV site (for any use) and notify receiving hospital staff of extravasation at patient handoff. Leave the IV cannula in place.

Spinal Motion Restriction

Spinal Motion Restriction
What: Spinal Motion Restriction (SMR) is a process of safely assessing and securing a patient with potential spinal cord injury to limit additional injury and further neurological impact by reducing movement of the spine.

How: SMR uses the same principles as traditional spinal immobilization. The patient's head is manually stabilized in the position found. After assessment, and if it does not cause pain, the patient's head is to be returned to neutral position, and an appropriately sized cervical collar is applied. (If pain with movement, patient should be manually stabilized in the position found.) The patient is moved along the long axis of the spine, to minimize flexion, extension or rotation of the spine. Approved SMR transfer devices include scoop stretchers (preferred), long spine boards, vacuum splints, extrication vests, etc. Manual stabilization of the head is only released once the patient is secured to the scoop stretcher or other spinal motion restricting transfer device with spider straps, and head securing commercial device or towel rolls/tape.

At no time are patients who require SMR to have only the head of the stretcher raised. Any need to elevate the patient's head would require the head of the SMR transfer device to be elevated and secured in the lowest elevated position possible. Patients who have or are anticipated to have emesis should be transported with the SMR transfer device in place to assist with airway maintenance.

Once the patient is safely positioned on an ambulance stretcher, SMR transfer devices should be considered for removal. This can only be performed if an adequate number of trained personnel are present to minimize unnecessary movement during the removal process. The stretcher should be on level/solid ground and reduced to the lowest level possible (for safety). The risks of patient manipulation must be weighed against the benefits of device removal. If transport time is short, the patient may be transported on the device and coordinate removal with hospital staff upon arrival. If the SMR transfer device is removed in the field, SMR should be maintained by assuring patient remains securely positioned on ambulance stretcher with five-point restraint, c-collar in place and lying flat on stretcher.

A patient meeting SMR criteria who has been removed from the SMR transfer device should only be transferred from the ambulance stretcher with the use of a slide board and moved to the hospital bed with such. During such move the patient's head must be manually stabilized and the C-Collar remains in place.

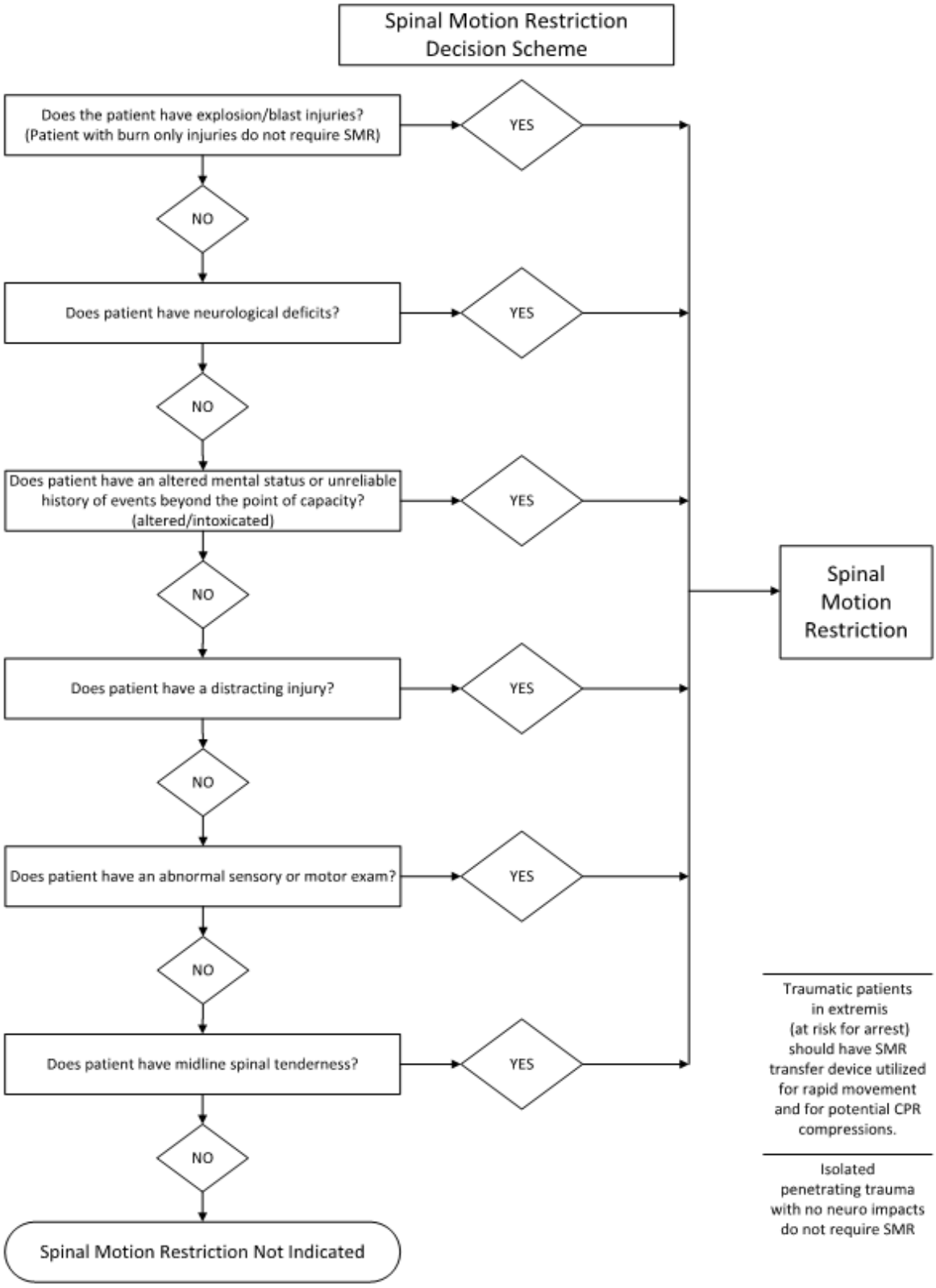
Hospitals should be prepared and equipped to carefully and quickly remove patients from a SMR transfer device ASAP after hospital arrival. Safe transfer will require the use of a slide board to maintain SMR during pt movement. Procedures must assure a sufficient number of properly trained individuals are available to assist with pt transfers to minimize risk of inadvertent displacement of a potentially unstable spinal injury.

SMR Not Indicated

What: When a patient based on assessment and mechanism does not require SMR.

How: The SMRNI patient can be moved utilizing any mechanisms used for medical patients.

SMR Decision Scheme



Bites and Envenomation Protocol

EMR, EMT, TEMS, A-EMT/ EMT-I, Paramedic Care:

1. Routine Trauma Care Protocol should be initiated.
2. **Contact Medical Control**.

Critical Thinking Elements

- **Snake bites are NOT an indication for tourniquet application.**

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Traumatic Arrest Protocol

Resuscitation success rates of trauma patients in cardiac arrest are extremely poor, usually due to prolonged hypoxia. Efforts to resuscitate are more likely to be successful if EMS arrives early in the arrest, understands the differences between traumatic cardiac arrest patients & medical cardiac arrest patients and treatment is directed at identifying & treating the underlying cause. Traumatic arrest is usually caused by airway problems (unmanaged airway during unconsciousness), breathing problems (from chest trauma) and/or circulatory problems (internal or external hemorrhaging).

Patients who are found in **asystole** after massive blunt trauma or penetrating trauma of a vital organ are dead and may be pronounced dead at scene with the concurrence of Medical Control.

EMR, EMT, TEMS, A-EMT/ EMT-I, Paramedic Care

Care should be focused on rapid assessment confirming that the patient is in cardiac arrest and determine if resuscitation will be attempted. Medical Control must be consulted for death determination on scene. If resuscitative efforts are going to be attempted, begin resuscitation *immediately* and "Load & Go" with the patient.

1. Rapidly assess to determine possible causes of the arrest and determine if resuscitation will be attempted. If treatment cannot be started immediately, consider how the delay will impact the ability to resuscitate the patient.
2. Initiate cardiac arrest protocols and procedures.
3. **Rapidly extricate, perform SMR and "Load & Go". Once transport is on scene, all treatment should be done enroute to hospital.**
4. "Load & Go" with any type of penetrating trauma. If transport agency is not on scene at the time traumatic arrest occurs or is identified, work to minimize scene time.
5. **EMT Care:** High Quality CPR. Place a **Supraglottic Airway** using in-line stabilization of the cervical spine or utilize basic airway control techniques.
6. **TEMS Care, A-EMT/ EMT-I and Paramedic Care:** If advanced airway control is indicated: May attempt **intubation x1** maintaining strict inline cervical immobilization. If airway appears difficult, or if inline cervical immobilization is not feasible during airway control, utilize a supraglottic airway or utilize basic airway control techniques.
   Obtain **IV access** enroute to the hospital with a 14g or 16g IV catheter (if possible). A 2nd line may be established if time permits.
   IV Fluid Therapy: 500mL fluid bolus to achieve and maintain a systolic BP of >90mmHg. Repeat as necessary.
7. **TEMS and Paramedic Care Only: Bilateral needle chest decompression** if chest trauma is present and the patient is in traumatic cardiac arrest.

Field Triage Scheme

National Guideline for the Field Triage of Injured Patients

RED CRITERIA
High Risk for Serious Injury

Injury Patterns	Mental Status & Vital Signs
• Penetrating injuries to head, neck, torso, and proximal extremities • Skull deformity, suspected skull fracture • Suspected spinal injury with new motor or sensory loss • Chest wall instability, deformity, or suspected flail chest • Suspected pelvic fracture • Suspected fracture of two or more proximal long bones • Crushed, degloved, mangled, or pulseless extremity • Amputation proximal to wrist or ankle • Active bleeding requiring a tourniquet or wound packing with continuous pressure	**All Patients** • Unable to follow commands (motor GCS < 6) • RR < 10 or > 29 breaths/min • Respiratory distress or need for respiratory support • Room-air pulse oximetry < 90% **Age 0–9 years** • SBP < 70mm Hg + (2 x age years) **Age 10–64 years** • SBP < 90 mmHg or • HR > SBP **Age ≥ 65 years** • SBP < 110 mmHg or • HR > SBP

Patients meeting any one of the above RED criteria should be transported to the highest-level trauma center available within the geographic constraints of the regional trauma system

YELLOW CRITERIA
Moderate Risk for Serious Injury

Mechanism of Injury	EMS Judgment
• High-Risk Auto Crash – Partial or complete ejection – Significant intrusion (including roof) • >12 inches occupant site OR • >18 inches any site OR • Need for extrication for entrapped patient – Death in passenger compartment – Child (Age 0–9) unrestrained or in unsecured child safety seat – Vehicle telemetry data consistent with severe injury • Rider separated from transport vehicle with significant impact (eg, motorcycle, ATV, horse, etc.) • Pedestrian/bicycle rider thrown, run over, or with significant impact • Fall from height > 10 feet (all ages)	**Consider risk factors, including:** • Low-level falls in young children (age ≤ 5 years) or older adults (age ≥ 65 years) with significant head impact • Anticoagulant use • Suspicion of child abuse • Special, high-resource healthcare needs • Pregnancy > 20 weeks • Burns in conjunction with trauma • Children should be triaged preferentially to pediatric capable centers **If concerned, take to a trauma center**

Patients meeting any one of the YELLOW CRITERIA WHO DO NOT MEET RED CRITERIA should be preferentially transported to a trauma center, as available within the geographic constraints of the regional trauma system (need not be the highest-level trauma center)

Field Triage Scheme

- *For the RED CRITERIA transport recommendations, patients in extremis (e.g., unstable airway, severe shock, or traumatic arrest) may require transport to the closest hospital for initial stabilization, prior to transport to a level I-II trauma center for definitive care.
- Pediatric patients meeting the RED CRITERIA should be preferentially triaged to pediatric-capable trauma centers.
- The EMS Judgement criteria should be considered in the context of resources available in the regional trauma system, including consideration of on-line medical control for further direction.
- Examples of patients with special, high resource healthcare needs include tracheostomy with ventilator dependence, cardiac assist devices, etc.
- Patients with combined burns and trauma should be preferentially transported to a trauma center with burn care capability. If not available, then a trauma center takes precedence over a burn center.
- Specific age used to define “children” is based on local system resources and practice patterns.

Extremity Injury Protocol

Attention should be given to extremity injuries to limit further damage and discomfort for the patient. However, extremity care should never interfere with lifesaving decisions or interventions and should not delay transport of trauma patients.

Signs of extremity injury include:

- Deformity
- Contusion
- Tenderness
- Swelling
- Instability
- Crepitus
- Absence of distal pulses

EMR, EMT, A-EMT/ EMT-I, Paramedic Care

Care should be focused on assessing the situation and initiating care to assure the patient is maintaining an airway, is breathing, and has a perfusing pulse and beginning treatment for shock.

1. Render initial care in accordance with the *Routine Patient Care Protocol*.
2. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a) If no obvious respiratory distress is noted, apply a pulse ox. If ≥ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If ≤94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to ≥94%.
3. Control any external bleeding:
    a) Apply direct pressure and pressure dressing.
    b) Refer to bleeding control protocol (tourniquet) for bleeding not quickly controlled with direct pressure and dressings.
4. If the extremity is angulated, pulseless, and/or other concerns for neurovascular compromise, reduce it by gently applying manual traction (back to anatomical position) until the pulse returns or attempts are found to be unsuccessful.
    a) Reassess distal pulse, motor and sensation.
5. Splint musculoskeletal injuries:
    a) Immobilize the joints with a rigid splint above and below the injury for long bone injuries.
    b) Immobilize the long bones with a rigid splint above and below the injured site for joint injuries.
    c) Assure the joints and bones are immobilized sufficiently to stabilize the injured structures (especially when using a soft splint or pillow).
    d) Assess distal pulse, motor & sensation.

Extremity Injury Protocol

EMR, EMT, TEMS, A-EMT/ EMT-I, Paramedic Care (Continued)

5. Amputation cases:
    a) Control external bleeding.
    b) Dress, bandage and/or splint the injured extremity.
    c) Attempt to recover the severed part:
        - Grossly decontaminate any debris from the severed part with NS or sterile water.
        - Wrap in slightly damp sterile gauze, towel, or sheet. (care must be taken to not make the part "soggy").
        - Place severed part in waterproof bag or container and seal.
        - Place the bag/container in another container filled with ice.
        - DO NOT immerse the amputated part in any solutions.
        - DO NOT allow the tissue to freeze.
        - Transport the container with the patient.

6. Initiate Paramedic Care intercept if needed and transport as soon as possible.
7. Contact the receiving hospital as soon as possible or Medical Control if necessary.

TEMS and A-EMT/ EMT-I Care

1. A-EMT/ EMT-I includes all components of *EMT Care*.
2. Obtain **IV access**.
3. **IV Fluid Therapy**: 500mL fluid boluses as needed to maintain a systolic BP $\geq$ 90 mmHg.
4. **Manage patient pain** based on *Pain Control Protocol*.

Paramedic Care

1. Paramedic Care includes all components of *A-EMT/ EMT-I*.
2. Contact the receiving hospital as soon as possible or Medical Control if necessary.

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Needle Thoracentesis (Needle Chest Decompression) Procedure

(TEMS & Paramedic Care Only)

Thoracic decompression involves placement of a needle through the chest wall of a **critical patient who has a life-threatening tension pneumothorax and is rapidly deteriorating due to intrathoracic pressure**. *Remember: a simple pneumothorax usually requires routine to supportive care only;* a tension pneumothorax is an immediate life threat! Signs and symptoms of **tension** pneumothorax include:

- Absent lung sounds on the affected side.
- Unequal breath sounds
- Severe respiratory distress
- Traumatic cardiac arrest
- Restlessness and agitation
- Hypotension/ tachycardia
- Increased airway resistance with ventilations
- JVD
- Subcutaneous emphysema
- Hyper resonance to percussion on the affected side
- Cyanosis
- Tracheal deviation
- Respiratory arrest

Initiate *Routine Trauma Care*. If a **tension** pneumothorax is identified:

1. Locate the 4th intercostal space at the mid-axillary line on the side of the pneumothorax. (if this location is inaccessible, use the 2nd intercostal space at the mid-clavicular line on the same side as the pneumothorax).
2. Cleanse the site with povidone-iodine preps and maintain as much of a sterile field as possible.
3. Attach a 10-20mL syringe to a 3.25 inch (minimum) 10-14g IV catheter (or system approved device).
4. Puncture the skin perpendicularly, just superior to the 5th rib (in the 4th intercostal space). Direct the needle just over the 5th rib (or 3rd rib if midclavicular access) and into the thoracic cavity. A "pop" should be felt as well as a "rush of air" along with the plunger of the syringe moving outward.
5. Advance the catheter while removing the needle and syringe.
6. Secure the catheter in the chest wall with a dressing and tape.
7. Monitor the patient **closely** and continue to reassess.

Critical Thinking Elements

- **Nerve bundles and blood vessels are located under the ribs and puncturing them could cause nerve damage and extensive bleeding. Ensure that the puncture is being made over the top of the 5th rib.**
- **Should the tension pneumothorax reoccur, repeat the above process on the affected side with a new needle.**

Flail Chest Treatment Protocol

Flail chest occurs when two or more adjacent ribs are fractured in more than one place along their length. The result is a segment of chest wall that is no longer in continuity with the remainder of the chest. When the respiratory muscles contract to raise the ribs up and out and lower the diaphragm, the flail segment paradoxically moves inward in response to the negative pressure being created within the thoracic cavity. Similarly, when these muscles relax, the segment may move outward as pressure inside the chest increases. This paradoxical motion of the flail segment makes ventilation less efficient. The degree of inefficiency is directly related to the size of the flail segment. The significant force necessary to produce such a lesion is generally transmitted to the underlying lung, resulting in a pulmonary contusion. The patient thus may have two mechanisms that compromise ventilation. Management of flail chest is directed toward pain relief, ventilatory support, and monitoring for deterioration.

EMR Care

Care should be focused on assessing the situation and initiating care to assure the patient is maintaining an airway, is breathing, and has a perfusing pulse and beginning treatment for shock.

1. Render initial care in accordance with the *Routine Patient Care Protocol* and *Routine Trauma Care Protocol*.
2. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a. If no obvious respiratory distress is noted, apply a pulse ox. If $\geq$ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If $\leq$94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to $\geq$94%.
    b. **Patients with poor respiratory effort may require ventilation with a BVM at 8-10 breaths/min.**
3. Control bleeding based on *Bleeding Control Protocol*.

EMT Care

EMT Care should be directed at conducting a thorough patient assessment, initiating routine patient care to assure that the patient has a patent airway, is breathing and has a perfusing pulse as well as beginning treatment for shock and preparing the patient for or providing transport.

1. EMT Care includes all components of *EMR Care*.
2. Repeat vital signs, GCS & RTS every ***5 minutes***.
3. Initiate ALS intercept and transport as soon as possible.
4. Apply **waveform capnography** (if equipped).

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Flail Chest Treatment Protocol

TEMS and A-EMT/ EMT-I Care

1. A-EMT/ EMT-I includes all components of *EMT Care*.
2. Obtain **IV access**.
3. **IV Fluid Therapy**: 500mL fluid bolus as needed to maintain a systolic BP $\geq$ 90 mmHg.
4. **Manage patient pain** based on *Pain Control Protocol*.

Paramedic Care

1. Paramedic Care includes all components of *A-EMT/ EMT-I*.
2. Contact the receiving hospital as soon as possible or Medical Control if necessary.

Critical Thinking Elements

- **Support of ventilation with bag-mask device assistance or endotracheal intubation may be necessary (particularly with longer transport times) for those patients who are having difficulty maintaining adequate oxygenation.**
- **Efforts to stabilize the flail segment with sandbags or other means are contraindicated as they may further compromise chest wall motion and possibly impair ventilations.**
- **Always maintain a high index of suspicion for pneumothorax/hemothorax!**

Unstable Pelvic Fracture Protocol

Pelvic fractures and more specifically unstable pelvic fractures have some of the highest morbidity rates of all traumas. Patients who have signs or symptoms of an unstable pelvic injury need that injury stabilized early in treatment to limit internal bleeding.

Signs of an unstable pelvic injury include:

- Pain in the abdomen and/ or pelvic region
- Pain to the super pubic region upon light palpation
- Inability to relax lower extremities straight out
- Uneven lower extremities
- Bruising over abdomen
- Distended abdomen

EMR

Care should be focused on assessing the situation and initiating care to assure the patient is maintaining an airway, is breathing, has a perfusing pulse and beginning treatment for shock.

1. Render initial care in accordance with the *Routine Patient Care Protocol*.
2. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a) If no obvious respiratory distress is noted, apply a pulse ox. If ≥ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If ≤94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to ≥94%.
    b) Use great care if moving patient.

EMT, A-EMT/ EMT-I, Paramedic Care

1. **Apply Pelvic Sling** (If symptoms indicate, the Pelvic Sling can be applied before the patient is moved from position found.
    a) Remove any objects from patient's pockets and pelvic area.
    b) Place Sling with white side closest to patient beneath the hips (trochanters). Do not apply over the Iliac Crest.
    c) Place black strap through buckle and pull completely through until snug.
    d) Hold orange strap and pull black strap in opposite direction until you hear and feel **one** buckle click. A second click after the device is secured is not uncommon.
    e) Contact **Medical Control Order** for assistance Pediatrics and adolescents. The standard sized device should fit most of the adult population but there are three sizes of the device.
    f) Secure ankles/ lower legs together with Kling to provide additional stability.

2. Render care in accordance with *Routine Trauma Protocol* and *Trauma Shock Protocol*

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Bleeding Control Protocol

Recent military campaigns have provided increased medical evidence as well as necessitated improved design of bleeding control techniques that can be rapidly deployed in the prehospital setting. Increasing evidence shows that tourniquets can be useful tools in the prehospital treatment of some critically injured patients if applied for short periods of time without creating an absolute desolate outcome for the extremity where applied.
When assessing the patient with uncontrolled hemorrhage, the prehospital provider must make a rapid assessment of if the bleeding can be controlled via traditional means (direct pressure, pressure points, elevation) or if more aggressive treatment is needed. If initial assessment determines that bleeding cannot be control with traditional means, immediately move to tourniquet and or wound packing/ hemostatic agents.

EMR, EMT, A-EMT/ EMT-I, Paramedic Care

Direct Pressure

Direct Pressure is the **first-line** treatment of bleeding control.

- Apply direct pressure to the site of bleeding with dressing and gauze, hold steady pressure for 5 minutes without removing the dressings.
- Some bleeding will require immediately moving to a tourniquet and/or wound packing.

Wound Packing

Indications for Wound Packing

- Uncontrolled bleed that direct pressure cannot control.
- Junctional (groin and Axilla) or extremity wounds with bleeding that cannot be controlled because the bleeding cannot be controlled with direct pressure or tourniquet.

Contraindications for Wound Packing

- Any bleed that can be controlled by traditional means or by tourniquet.
- Abdominal or chest wounds.

Procedure for Wound Packing

- Obtain Hemostatic Gauze or rolled gauze.
- With gloved hand, find source of bleeding and apply direct pressure with 1-2 fingers.
- Without releasing pressure, begin packing unrolled gauze into injury cavity until bleeding stops or no area in wound cavity remains unpacked.
- If unable to control with initial roll and using Hemostatic Gauze, **remove** Hemostatic Gauze to apply fresh gauze to bleeding site. If using rolled gauze, continue packing with another roll**. Do not remove** previous roll.
- When bleeding is controlled apply direct pressure for three minutes.

Bleeding Control Protocol

EMR, EMT, A-EMT/ EMT-I, Paramedic Care (cont.)

Tourniquet Application

**Agencies must use system approved commercial tourniquet device.

Indications for tourniquet use:

- Severe, ongoing hemorrhage from an extremity which is not alleviated quickly by standard direct pressure/ bandaging measures.
- Trauma with partial extremity amputation or extreme soft tissue injury.
- Bleeding from ruptured graft or fistula.

Contraindications for tourniquet use:

- Any bleeding that can be managed by direct pressure, elevation, and/ or pressure points.
- Major bleeding to a non-extremity.

Procedure for Tourniquet application

- Render care in accordance with *Routine Trauma Protocol* and *Shock Protocol.*
- Wrap Tourniquet around extremity proximal to bleeding site and secure per manufacturer's recommendation, do not cover joints. If unable to rapidly identify the injury location, then apply ''high and tight''.
    - If bleeding continues apply a second tourniquet proximal to the first (not covering joints) in the previously described fashion.
- Use great care when moving patient. Conscious patients may try to fight against the tourniquet due to the pain it can cause when occluding blood flow (consider pain meds).
- Tourniquets (once applied) should **NOT** be removed by EMS.
- Continuously reassess for hemostasis. Reassess after every move!

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Tranexamic Acid/ TXA Protocol

Paramedic Care Only

Traumatic injuries continue to be the leading cause of death in patients under forty years of age. TXA is now being used to treat severely injured trauma patients who have or at great risk for severe hemorrhage.
Tranexamic Acid (TXA) is a synthetic amino acid (Lysine) that blocks plasminogen from being converted to the enzyme plasmin. Plasmin works to break down already-formed blood clots in the human body by attacking and breaking down fibrin destroying clots in a process known as fibrinolysis. Studies have shown Tranexamic Acid to improve clotting ability while reducing the magnitude of the inflammatory response by the body.

Assessment

When considering the appropriateness of Tranexamic Acid therapy, all the following inclusion criteria must be considered.

Inclusion criteria for the administration of Tranexamic Acid.

1. Patient age of 18 years or older.
2. Penetrating and/or blunt trauma to chest, abdomen or pelvis who are at high risk for ongoing hemorrhage.
    a. Sustained tachycardia HR >120.
    b. Sustained hypotension SBP < 90 mmHg.
3. Signs of peripheral vasoconstriction
    a. Cool, pale skin.
    b. Delayed cap refill.
4. **Injury occurred ≤ 3 hours prior to TXA administration.**

Absolute exclusion criteria

1. Head injury
2. Time of injury > 3 hours or unknown.
3. Patients who antifibrinolytic therapy is contraindicated.
    a. A history of DVT/PE or procoagulant disorder (i.e. protein c, protein s or Antithrombin III disorder)
4. Age less than 18

Treatment and Interventions

1. Initiate patient care based on the *Patient Care Overview* and *Trauma Care Overview*.
2. **Tranexamic Acid:** 1 gm in 100 mL D5W over 10 minutes IV infusion

Critical Thinking Elements

- **TXA should never be administered at a "wide open" rate.**
- **Female patients taking or using any form of birth control containing estrogen or progestin are at increased risk for blood clots. This medication significantly increases that risk.**
- **Hypotension has been observed when TXA is administered too rapidly.**
- **Use with caution in patients with a history of DVT, PE, known clotting disorders, and severe renal failure.**

According to the manufacturer, TXA should be given via a dedicated IV line.*

Crush Injury Protocol

For patients with limb entrapment / evidence of crush and prolonged time to extrication from point of injury (>30 min), initiate treatment for crush injury.

EMR Care

EMR Care should be focused on assessing the situation and initiating routine patient care to assure that the patient has a patent airway, is breathing and has a perfusing pulse as well as beginning treatment for potential development of shock.

1. Render initial care in accordance with the Routine Patient Care Protocol and Routine Trauma.
2. **Oxygen**: If respiratory distress is noted, 15 LPM via NRM or if unable to tolerate the mask, 6 LPM via nasal cannula.
    a. If no obvious respiratory distress is noted, apply a pulse ox. If $\geq$ 94% and no signs/ symptoms of respiratory distress, no Oxygen is required. If $\leq$94% apply nasal cannula at 2-6 LPM or 15 LPM via NRM as needed to raise pulse ox to $\geq$94%.
3. Control bleeding based on Bleeding Control Protocol

EMT Care

EMT Care should be directed at conducting a thorough patient assessment, assuring that the patient has a patent airway, is breathing, and has a perfusing pulse. Begin treatment for potential development of shock while preparing the patient for extrication.

1. EMT Care includes all components of EMR Care.
2. Apply **waveform capnography** (if equipped).
3. If airway control becomes necessary, maintain inline cervical immobilization while doing so.
4. Initiate Paramedic intercept and transport as soon as possible.

A-EMT/ EMT-I Care

A-EMT/ EMT-I should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, initiating components of diuresis (fluids), and preparing for extrication.

1. A-EMT/ EMT-I includes all components of EMT Care.
2. Obtain **IV access**.
3. **IV Fluid Therapy**: 1000mL fluid bolus of Normal Saline "wide open". Continue as needed 500 mL at a time to maintain a systolic BP $\geq$ 90 mmHg.

Crush Injury Protocol

Paramedic Care

Paramedic Care should be directed at continuing or establishing care, conducting a thorough patient assessment, stabilizing the patient's perfusion, influencing diuresis (fluids), treating electrolyte disturbances, and preparing for or providing patient extrication and transport.

1. Paramedic Care includes all components of A-EMT/ EMT-I.
2. Apply **Cardiac monitor** or perform **12-lead-ekg** to evaluate for evidence of Hyperkalemia, including widening QRS > 120msec and peaked T-waves.
3. If evidence of Hyperkalemia (as above) is noted:
   a. **Calcium Gluconate:** 1gm IV/IO slow push over 2 minutes.
   b. If no change in patient condition, proceed with **Sodium Bicarbonate**: 50mEq IV/IO push. *Sodium bicarbonate may form a solid with Calcium Gluconate – ensure the line is properly flushed before and after if giving both medications.*

   *For patients without clinical signs of hyperkalemia but the history/exam is concerning for high risk of Hyperkalemia (e.g. Crushed >1 hour), **contact Medical Control** for possible orders for Calcium Gluconate and/or Sodium Bicarb.

Critical Thinking Elements

- **For cases of limb entrapment that may require field amputation, contact Medical Control as soon as possible to discuss options for EMS Physician Field Response**