

Tab 1000

Trauma Protocols



Lucas County Emergency Medical Services
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TAB 1000
TRAUMA PROTOCOLS
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A

Trauma Triage

Trauma Diversion



Definitions (Ohio's legal definition of trauma):

A. **“Trauma” or “traumatic injury”** means severe damage to or destruction of tissue that satisfies both of the following conditions:

1. It creates a significant risk of any of the following:

- a) Loss of life;
- b) Loss of a limb;
- c) Significant, permanent disfigurement;
- d) Significant, permanent disability; and

2. It is caused by any of the following:

- a) Blunt or penetrating injury;
- b) Exposure to electromagnetic, chemical, or radioactive energy;
- c) Drowning, suffocation, or strangulation;
- d) A deficit or excess of heat.

B. **“Evidence of poor perfusion”** means physiologic indicators of hemorrhage or decreased cardiovascular function, which may include any of the following symptoms:

- 1. Weak, distal pulse;
- 2. Pallor;
- 3. Cyanosis;
- 4. Delayed capillary refill;
- 5. Tachycardia.

C. **“Evidence of respiratory distress or failure”** means physiologic indicators of decreased ventilatory function, which may include any of the following symptoms:

- 1. Stridor;
- 2. Grunting;
- 3. Retractions;
- 4. Cyanosis;
- 5. Hoarseness;
- 6. Difficulty speaking.



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Trauma Triage

Trauma Diversion



Trauma Triage Protocol, continued

D. **“Evidence of hemorrhagic shock”** means physiologic indicators of blood loss that may include any of the following symptoms:

1. Delayed capillary refill;
2. Cool, pale, diaphoretic skin;
3. Decreased systolic blood pressure with narrowing pulse pressure;
4. Altered level of consciousness.

E. **“Seatbelt sign”** means abdominal or thoracic contusions and abrasions resulting from the use of a seatbelt during a motor vehicle collision.

F. **“Signs or symptoms of spinal cord injury”** means physiologic indicators that the spinal cord is damaged, including, but not limited to, paralysis, weakness, numbness, or tingling of one or more extremities.

G. **“Evidence of neurovascular compromise”** means physiologic indicators of injury to blood vessels or nerves including, but not limited to, pallor, loss of palpable pulses, paralysis, paraesthesia, or severe pain.

H. **“Body region”** means a portion of the trauma victim’s body divided into the following areas:

1. Brain
2. Head, face and neck
3. Chest
4. Abdomen and pelvis
5. Extremities
6. Spine

I. **“Evidence of traumatic brain injury (TBI)”** means signs of external trauma and physiologic indicators that the brain has suffered an injury caused by external force including, but not limited to:

1. Decrease in level of consciousness from the victim’s baseline
2. Unequal pupils
3. Blurred vision
4. Severe or persistent headache
5. Nausea or vomiting
6. Change in neurological status



A

Trauma Triage

Trauma Diversion



Trauma Triage Protocol, continued

Determination of Major and Intermediate trauma victims

Emergency medical service personnel shall use the criteria in this policy, consistent with their certification, to evaluate whether an injured person qualifies as major or intermediate adult, pediatric or geriatric trauma victim.

1. An **adult major trauma victim** is a person **between the ages of 16 and 69 years of age** inclusive, exhibiting one or more of the following physiologic or anatomic conditions:
 - a. **Physiologic Conditions:**
 - i. Glasgow coma scale ≤ 12 ;
 - ii. Deterioration in level of consciousness at the scene or during transport;
 - iii. Failure to localize to pain (GCS motor component ≤ 4);
 - iv. Requires endotracheal intubation;
 - v. Requires relief of tension pneumothorax;
 - vi. Pulse > 120 in combination with evidence of hemorrhagic shock;
 - vii. Systolic BP < 90 , or absent radial pulse with carotid pulse present;
 - b. **Anatomic Conditions:**
 - i. Penetrating trauma to the head, neck, or torso;
 - ii. Significant penetrating trauma to extremities proximal to the knee or elbow with evidence of neurovascular compromise;
 - iii. Injuries to the head, neck, or torso where the following physical findings are present:
 - 1) Visible crush injury;
 - 2) Pelvic fracture;
 - 3) Flail chest;
 - iv. Injuries to the extremities where the following physical findings are present:
 - 1) Amputations proximal to the wrist or ankle;
 - 2) Visible crush injury;
 - 3) Fractures of two or more proximal long bones;
 - 4) Evidence of neurovascular compromise;
 - v. Signs or symptoms of spinal cord injury;
 - vi. Second or third degree burns $> 10\%$ total body surface area or other significant burns involving face, feet, hands, genitalia or airway.



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Trauma Triage

Trauma Diversion



Trauma Triage Protocol, continued

2. An **adult intermediate trauma victim** is a person **between the ages of 16 and 69 years of age** inclusive, who does not qualify as a major trauma victim and who exhibits one or more of the following physiologic or anatomic conditions.
 - a. **Physiologic Conditions:**
 - i. Glasgow coma scale = 13;
 - ii. Loss of consciousness greater than 5 minutes witnessed by any EMT;
 - iii. Pulse >120 without evidence of hemorrhagic shock;
 - iv. Respiratory rate <10 or >29.
 - b. **Anatomic Conditions:**
 - i. Significant penetrating trauma to extremities proximal to the knee or elbow with evidence of neurovascular compromise;
 - ii. Injuries to the head, neck, or torso where there is abdominal tenderness, distention or seat belt sign.
3. A **pediatric major trauma victim** is a person **<16 years of age** exhibiting one or more of the following physiologic or anatomic conditions:
 - a. **Physiologic Conditions:**
 - i. Glasgow coma scale \leq 12;
 - ii. Deterioration in level of consciousness at the scene or during transport
 - iii. Failure to localize to pain (GCS motor component \leq 4);
 - iv. Evidence of poor perfusion or evidence of respiratory distress or failure.
 - b. **Anatomic Conditions:**
 - i. Penetrating trauma to the head, neck or torso;
 - ii. Significant penetrating trauma to extremities proximal to the knee or elbow with evidence of neurovascular compromise;
 - iii. Injuries to the head, neck or torso where the following physical findings are present:
 - 1) Visible crush injury;
 - 2) Pelvic fracture;
 - 3) Flail chest;

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Trauma Triage

Trauma Diversion



Trauma Triage Protocol, continued

- iv. Injuries to the extremities where the following physical findings are present:
 - 1) Amputations proximal to the wrist or ankle;
 - 2) Visible crush injury;
 - 3) Fractures of two or more proximal long bones;
 - 4) Evidence of neurovascular compromise.
- v. Signs and symptoms of spinal cord injury;
- vi. Second or third degree burns >10% total body surface area or significant burns involving face, feet, hands, genitalia or airway.

4. A **pediatric intermediate trauma victim** is a person **<16 years of age** exhibiting one or more of the following physiologic or anatomic conditions:
 - a. **Physiologic Conditions:**
 - i. Glasgow coma scale = 13;
 - ii. Loss of consciousness greater than 5 minutes witnessed by any EMT;
 - b. **Anatomic Conditions:**
 - i. Significant penetrating trauma to extremities proximal to the knee or elbow with evidence of neurovascular compromise;
 - ii. Injuries to the head, neck, or torso where there is abdominal tenderness, distention or seat belt sign.
5. For adult and pediatric trauma victims, emergency medical service personnel shall also consider mechanism of injury and special considerations, as taught in the EMT-basic, EMT-intermediate, or EMT-paramedic curriculum, when evaluating whether an injured person qualifies as a trauma victim. **Mechanism of injury and special considerations are NOT stand alone indicators for determination of trauma level, but rather should be factored into the overall assessment.**



Trauma Triage Protocol, continued,

6. A **geriatric major trauma victim** is a person **≥ 70 years of age** exhibiting one or more of the following causes of injury or physiologic or anatomic conditions.

a. **Physiologic Conditions:**

- i. Glasgow coma scale ≤ 14 in a trauma patient with a known or suspected traumatic brain injury (TBI);
- ii. Glasgow coma score ≤ 13 ;
- iii. Deterioration in level of consciousness at the scene or during transport;
- iv. Failure to localize to pain (GCS motor component ≤ 4);
- v. Requires endotracheal intubation;
- vi. Requires relief of tension pneumothorax;
- vii. Pulse > 120 in combination with evidence of hemorrhagic shock;
- viii. Systolic BP < 100 , or absent radial pulse with carotid pulse present;

b. **Anatomic Conditions:**

- i. Penetrating trauma to the head, neck, or torso;
- ii. Significant penetrating trauma to extremities proximal to the knee or elbow with evidence of neurovascular compromise;
- iii. Injuries to the head, neck, or torso where the following physical findings are present:
 - 1) Visible crush injury;
 - 2) Pelvic fracture;
 - 3) Flail chest;
- iv. Injuries to the extremities where the following physical findings are present:
 - 1) Amputations proximal to the wrist or ankle;
 - 2) Visible crush injury;
 - 3) Fractures of one proximal long bone sustained as a result of a motor vehicle crash;
 - 4) Evidence of neurovascular compromise;
- v. Signs or symptoms of spinal cord injury;
- vi. Second or third degree burns $\geq 10\%$ total body surface area, or other significant burns involving face, feet, hands, genitalia or airway.



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Trauma Triage

Trauma Diversion



Trauma Triage Protocol, continued,

- c. **Cause of Injury**
 - i. Pedestrian struck by a motor vehicle
 - ii. Fall from any height including standing falls, with evidence of a traumatic brain injury (TBI).
- 7. A **geriatric intermediate trauma victim** is a person **≥ 70 years of age** exhibiting one or more of the following causes of injury or physiologic or anatomic conditions:
 - a. **Physiologic Conditions:**
 - i. Glasgow coma scale ≥ 14 without known or suspected traumatic brain injury (TBI);
 - ii. Loss of consciousness greater than 5 minutes;
 - iii. Respiratory rate <10 or >29 .
 - b. **Anatomic Conditions:**
 - i. Injuries to the head, neck, or torso where the following physical findings are present:
 - 1) Abdominal tenderness, distention, or seatbelt sign;
 - ii. Injury sustained in two or more body regions.
- 8. Emergency medical service personnel shall also consider mechanism of injury and special considerations, as taught in the EMT-basic, EMT-intermediate, or EMT-paramedic curriculum, when evaluating whether an injured person qualifies as a trauma victim.



A

Trauma Triage

Trauma Diversion



Trauma Triage Protocol, continued,

Appropriate Destination –

A. LCEMS designated Trauma Centers:

- **The Toledo Hospital (Level I – Adult / Pediatric)**
- **University of Toledo Medical Center (Level II – Adult)**
- **St. Vincent Mercy Medical Center (Level I – Adult / Pediatric)**
- **St. Charles (Level III)**
- **Promedica Bay Park (Level III) – beginning 5/1/24**

B. Major trauma patients will be transported to the closest Level I or Level II Trauma Center. Intermediate trauma patients will be transported to the closest approved Level I, Level II or Level III trauma center. The appropriate destination may be modified by the following considerations:

1. It is medically necessary to transport the victim to another hospital for initial assessment and stabilization before transfer to an adult or pediatric trauma center;
2. It is unsafe or medically inappropriate to transport the victim directly to an adult or pediatric trauma center due to adverse weather or ground conditions or excessive transport time; a transport time in excess of 20 minutes as estimated by the transporting EMS unit may be considered excessive under this policy.
3. Transporting the victim to an adult or pediatric trauma center would cause a shortage of local emergency medical service resources;
4. No appropriate adult or pediatric trauma center is able to receive and provide adult or pediatric trauma care to the trauma victim without undue delay;
5. Before transport of a patient begins, the patient requests to be taken to a particular hospital that is not a trauma center or, if the patient is less than eighteen years of age or is not able to communicate, such a request is made by an adult member of the patient's family or a legal representative of the patient.



A Trauma Triage Trauma Diversion



Trauma Triage Protocol, continued,

6. Patients who meet pediatric major trauma protocol should be transported to the closest appropriate pediatric trauma center (**Toledo and SVMC have been designated as pediatric trauma centers**).
7. Burn patients who meet major trauma protocol criteria should be considered for transport to a designated burn center (**SVMC has been designated as a specialized care facility for burn injuries**).
8. A pregnant trauma patient in the second or third trimester of pregnancy should be transported to a trauma center that also provides obstetrical services.
 - a. ***Trauma in the second or third trimester (> 20 weeks) is NOT to be transported to UTMC because of a lack of neonatal and obstetrical services at that facility.***
 - b. ***Third trimester trauma patients in cardiac arrest are to be taken to the closest Level 1 or Level 2 Trauma Center, including UTMC.***
 - c. ***All pregnant trauma patients in the second or third trimester that do not meet adult trauma protocol criteria, but have suspected abdominal injuries, pain or vaginal bleeding/discharge should be taken to the closest acute care facility that can provide fetal monitoring (All Lucas County hospitals can provide fetal monitoring except UTMC).***
9. Isolated geriatric hip fractures should be transported to the closest available hospital.

NOTE: At no time should interventions be started that would delay transport after the patient has been placed into the life squad for transport. Interventions necessary for airway control may be an exception.



A

Trauma Triage

Trauma Diversion



Trauma Triage Protocol, continued

Early ***On-Line Medical Control*** contact will help facilitate emergency department readiness and mobilization of critical assessment/treatment teams (Trauma Services).

Trauma Radio Report

A. Minimal Radio Report

1. Contact with ***On-Line Medical Control*** is required.
2. Five elements are required when reporting a “Trauma Protocol” patient. The acronym **TAGEM** should be used:
 - **T** – Trauma Protocol (Paramedics must choose and declare one of the following categories to Lucas County EMS Dispatch and ***On-Line Medical Control***):
 - Adult Major Trauma Protocol
 - Adult Intermediate Trauma Protocol
 - Pediatric Major Trauma Protocol
 - Pediatric Intermediate Trauma Protocol
 - Geriatric Major Trauma Protocol
 - Geriatric Intermediate Trauma Protocol
 - **A** – Age of patient (estimated if necessary).
 - **G** – Gender of patient.
 - **E** – ETA
 - **M** – Mechanism of Injury (Briefly describe the mechanism of injury and basis for declaring “Trauma Protocol.”)



A

Trauma Triage

Trauma Diversion



Trauma Triage Protocol, continued

B. RCOG EMS Dispatch policy for Trauma Center med channel assignments:

1. Paramedic field assessment that reveals a “Trauma Protocol” patient should be communicated to RCOG EMS Dispatch with the appropriate patient qualifier (i.e., Adult Major or Intermediate; Pediatric Major or Intermediate; Geriatric Major or Intermediate). Upon patient designation, RCOG EMS Dispatch will assign, as medical control and transport, the closest appropriate Trauma Center based upon patient designation.



B Traumatic Death



Withholding Resuscitation

1. All decisions to withhold CPR and resuscitation efforts should be sufficiently documented and readily supported by protocol.
2. Avoid disturbing a potential crime scene unless it is necessary to do so to effect patient resuscitative efforts.
3. ECG confirmation of death is not required for:
 - a. Injuries incompatible with life;
 - b. The victim exhibits signs of decomposition, rigor mortis or extreme dependent lividity.
4. For other information (i.e., specific treatments / transport), refer to **Tab 800, Section O: Traumatic Cardiac Arrest.**

Recommendations for Withholding or Discontinuing Resuscitation in Traumatic Cardiopulmonary Arrest:

- A. Resuscitative efforts should be withheld for trauma patients with injuries that are obviously incompatible with life, such as decapitation or hemicorporectomy.
- B. Resuscitative efforts should be withheld for patients of either blunt or penetrating trauma when there is evidence of prolonged cardiac arrest, including rigor mortis or dependent lividity.
- C. Resuscitative efforts may be withheld for a blunt trauma patient who, on the arrival of EMS personnel, is found to be apneic, pulseless, and without organized electrocardiographic activity (Aystolic).
- D. Resuscitative efforts may be withheld for a penetrating trauma patient who, on arrival of EMS personnel, is found to be pulseless and apneic and there are no other signs of life, including spontaneous movement, electrocardiographic activity (Asystolic), and pupillary response.
- E. When the mechanism of injury does not correlate with the clinical condition, suggesting a non-traumatic cause of cardiac arrest, standard resuscitative measures should be followed.



C Amputations



A. Care of amputated parts.

1. Cooling and rapid transport are a priority.
2. Place the amputated part in a waterproof container, i.e., plastic bag, suction canister.
3. Use cold packs to cool the amputated part making sure the coolant does not come in direct contact with the amputated part.
4. Do not delay transport of the patient looking for body parts.
5. If located after the patient leaves the scene, care for the part as above and transport code 3 to the same hospital where the patient was transported.
6. Do not allow the part to become cold enough to freeze.

B. Specific information to be provided to the receiving hospital:

1. The location of the amputation(s)
2. What has been amputated?
3. Mechanism of the amputation.
4. Past medical history.
5. Is the amputated part(s) being transported with the patient?
6. Other injuries.
7. Vital signs.
8. Treatments that have been initiated.
9. ETA



D

Multi-System Trauma



This protocol applies to all patients who meet, as a minimum, Lucas County EMS Trauma Protocol guidelines (Tab 1000, Section A).

A. Multiple System Trauma Patient Priorities

1. Transport to an appropriate facility as outlined by protocol or ***On-Line Medical Control***.
2. History of incident (if available)
 - a. Mechanism of injury
 - b. Time of injury
 - c. Bystander aid
 - d. Extrication time (if applicable)
3. Past medical history (as available)
 - a. Medications
 - b. Pregnancy (female patients)
 - c. Medical conditions
 - d. Allergies
4. Physical Assessment at a minimum should include:
 - a. Level of consciousness
 - b. History of unconsciousness (if applicable)
 - c. In the unconscious patient – Level of response to:
 - i. Verbal stimulation
 - ii. Tactile stimulation
 - iii. Painful stimulation
 - d. Respiratory effort (rate, rhythm, quality)
5. Circulatory status
 - a. Pulse (rate, rhythm, quality)
 - b. Systolic BP
6. Skin (color, temperature, moisture)
7. Estimation of external hemorrhage (if applicable)

B. Treatment – **All treatments except Spinal Motion Restriction (SMR), CPR, control of life-threatening hemorrhage and airway control should be initiated after transport has been initiated. Scene time should be limited to no more than 10 minutes when possible.**

1. Transport and early notification of On-Line Medical Control may be the most beneficial thing to accomplish.
2. Spinal Motion Restriction (manually and then with adjunctive equipment)



Multi-System Trauma, cont.

3. Control of airway/ventilation:
 - a. High-flow oxygen (15lpm) via non-rebreather mask.
 - b. Positive pressure ventilation
 - i. Head injury patients with signs of increased ICP may benefit from mild hyperventilation
 - ii. Consider advanced airway placement for unconscious patients absent gag reflex
 - c. Avoid nasotracheal intubation if facial fractures suspected.
 - d. If structural deformity prohibits advanced airway placement, and airway obstruction is evident, a surgical airway may be indicated.
 - e. Thoracic chest decompressions should be accomplished for patients exhibiting signs and symptoms of tension pneumothorax.
 - i. Bilateral chest decompression may be warranted for traumatic arrest if airway compromise cannot be corrected with other BLS or ALS measures.
4. Circulatory Management
 - a. After transport has been initiated, establish a peripheral large-bore IV line for fluid replacement
 - b. For patients exhibiting signs and symptoms of shock, a second IV line is indicated as time permits.
 - c. Intraosseous (IO) infusion of fluid should be considered for patients who present unconscious with peripheral vein collapse.
 - d. Document amount of fluid administered during prehospital care.
 - e. Consider incremental fluid boluses (250mL) to attain "permissive hypotension" (Minimum MAP goals = 50 – 65mmHg; SBP = 70 – 90mmHg).
 - f. For adults in traumatic hemorrhagic shock with suspected need for massive blood transfusion (clinical evidence of marked blood loss – internal or external, sustained tachycardia and hypotension): Administer 1Gm TXA over 10 minutes.
 - g. For patients exhibiting signs and symptoms of spinal shock where loss of vascular tone has caused significant hypotension, consider Dopamine for blood pressure support not achieved with fluid bolus.
 - h. Keep patient warm
5. Cardiac Monitoring
 - a. Treat dysrhythmias per the appropriate protocol
6. Reassess patient frequently paying particular attention to airway and circulation.



D Multi-System Trauma



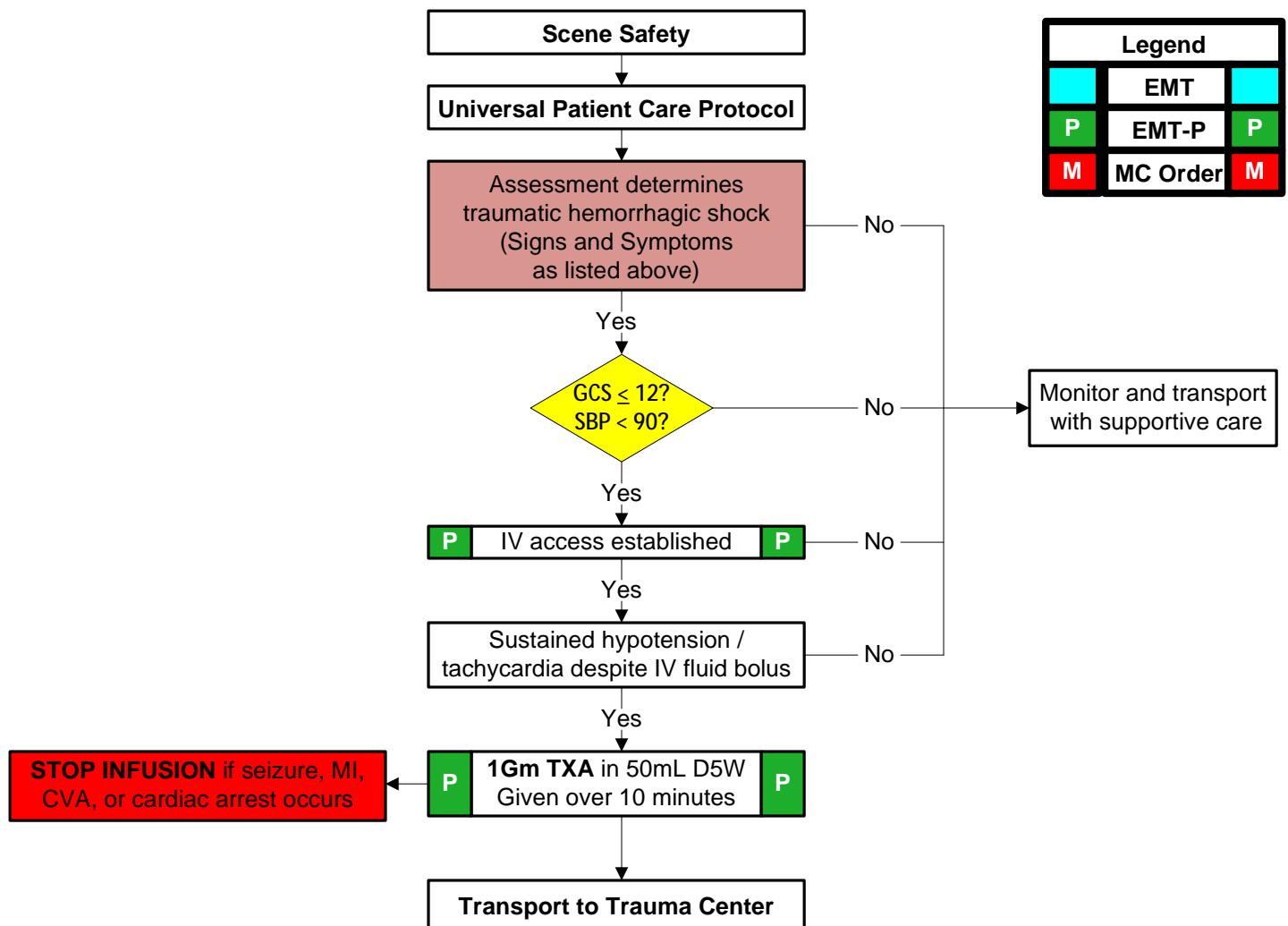
Multisystem Trauma, cont.

7. All BLS procedures (i.e., splinting) should be accomplished during transport to expedite patient delivery to the hospital.

E
Tranexamic Acid
(TXA, Cyclokapron)



History:	Signs / Symptoms:	Exclusion Criteria:
<ul style="list-style-type: none"> Adults in traumatic hemorrhagic shock (≥ 16 years of age) Suspected need of massive blood transfusion Clinical evidence of marked blood loss (internal/external) 	<ul style="list-style-type: none"> Evidence of marked blood loss Sustained tachycardia (> 110/min, despite 500mL fluid bolus) Initial BP < 90 Sustained hypotension Major trauma with suspicion for pelvic and/or abdominal injury Major arterial bleeding requiring tourniquet GCS ≤ 12 	<ul style="list-style-type: none"> GCS = 3 with unreactive pupils Injury occurred more than 3 hours ago or unknown injury time Cardiac arrest Clinical suspicion of acute MI or stroke Burns covering more than 20% BSA Suspected or known pregnancy Patient on renal dialysis





E Tranexamic Acid (TXA, Cyclokapron)



Tranexamic Acid (TXA)

Tranexamic acid (TXA) is a synthetic derivative of the amino acid lysine that inhibits fibrinolysis by blocking the lysine binding sites on plasminogen. Tranexamic acid safely reduced the risk of death in bleeding trauma patients in the CRASH-2 study. On the basis of these results, Tranexamic Acid should be considered for use in bleeding trauma patients.

Indications for Use:

Adults in traumatic hemorrhagic shock with suspected need for massive blood transfusion (clinical evidence of marked blood loss – internal or external, sustained tachycardia and hypotension).

Contraindications:

- Non-hemorrhagic shock
- Non-traumatic hemorrhagic shock
- Hemorrhagic shock stabilized by other measures
- Patients with significant closed head injury (contraindicated with subarachnoid hemorrhage)

Pharmacokinetics:

Onset of action within 4 hours after IV administration, exact time of onset unclear and variable. Delayed effects up to 48 hours consistent with anti-inflammatory actions.

Side Effects:

While a theoretical concern, TXA has not been shown to cause significant increase in deep venous thrombosis, pulmonary embolism, myocardial infarction, or stroke in published trials to date.

Adverse Effects:

Reported adverse events include:

- Acute gastrointestinal disturbances (nausea, vomiting and diarrhea)
- Visual disturbances (blurry vision and changes in color perception)
- Occasional thromboembolic events (e.g., deep venous thrombosis, pulmonary embolism)

Precautions:

- Begin infusion as soon as possible after injury but no later than 3 hours after injury.
- Do not give through the same IV as Hextend or blood products.
- Do not give IV push – will cause hypotension. Must be given over 10 minutes.



E Tranexamic Acid (TXA, Cyclokapron)



Tranexamic Acid (TXA) – continued

Dosage:

Adult:

- Administration of 1Gm of TXA in 50mL D5W IV as soon as possible, given over 10 minutes

Pediatric:

- No current recommendations for pediatric patients

How Supplied: 1Gm/10mL vial (100mg/mL)